



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/531,897	05/17/2006	Joo-Ho Kim	0001.1059	5791
49455 7590 02/11/2009 STEIN, MCEWEN & BUI, LLP 1400 EYE STREET, NW SUITE 300 WASHINGTON, DC 20005				
EXAMINER				
JOHNSON, CONNIE P				
ART UNIT		PAPER NUMBER		
1795				
MAIL DATE		DELIVERY MODE		
02/11/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/531,897

**Applicant(s)**

KIM ET AL.

**Examiner**

CONNIE P. JOHNSON

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 September 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date: \_\_\_\_\_

**DETAILED ACTION**

***Response to Amendment***

1. The remarks and amendment filed 9/23/2008 have been entered and fully considered.
2. Claims 1-26 are presented.
3. Claims 2, 4, 5, 6 and 24 are amended.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 14 is rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a credible asserted utility or a well established utility.

Claim 14 recites, "a method of forming a pattern using the pattern forming material of claim 1." However, claim 14 does not recite a positive method step.

Claim 14 is also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a credible asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1795

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-3, 9-15, 20-23 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamasaki et al., U.S. Patent Publication No. 2003/0143407 A1.

Yamasaki teaches a thermal-sensitive composition comprising a

- Support comprising thermal resistant material, such as aluminum and polypropylene (page 31, [0352]),
- a surface layer of the substrate (page 18, [0185]),
- a hydrophilic layer and a
- thin layers formed between the hydrophilic layer and thermal-sensitive layer and between the surface substrate layer and the substrate (page 18, [page 18, [0185]]).
- an underlayer formed just under the thermal-sensitive layer (page 26, [0282]).
- photosensitive or thermal-sensitive image-forming layer (page 13, [0129]),
- an overcoat layer comprising light to heat conversion material (page 26, [0282]).

The light to heat conversion material comprises Ag, Sb, Te and Ge as in claim 3 (page 26, [0276-0277]). Yamasaki does not specifically teach that the light to heat converting material is in a layer directly above and below the thermal-sensitive layer. However, it would have been obvious to one of ordinary skill in the art that the light to heat conversion material would be in the underlayer and overcoat layer because

Yamasaki teaches that the light to heat conversion material may be in any position of the thermal-sensitive composition (page 28, [0318]). Further, Yamasaki teaches the light to heat conversion material in the overcoat layer to improve sensitivity (page 29, [0334]). The thermal-sensitive layer comprises positive or negative-sensitive composition (page 14, [0142 and 0145]). The recitation in claim 2, "wherein the first and second light to heat converting layers absorb a first activation light radiated thereon and convert the absorbed activation light into heat", is a process limitation and does not add positive recitation to the claim. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted) (MPEP 2113). Yamasaki also teaches a method of forming the thermal-sensitive composition wherein the composition is exposed to light and the non-exposed region of the thermal-sensitive layer is removed thereby forming a pattern (page 3, [0032]). The recitation in claim 22, "wherein the thermal sensitive material layer changes properties due to heating or activation light irradiation, allowing a pattern to appear through a development process," also in claim 23 "wherein at least two surfaces of the thermal sensitive material layer are heated, enabling a high aspect ratio pattern to be formed" and claim 26, "wherein the photo and thermal sensitive layer is subjected to activation light irradiation, forming a fine pattern..." are process limitations and therefore have no patentable weight. The underlayer and overcoat layers comprise light

to heat converting material and are imagewise exposed to laser light, therefore the thermal-sensitive layer undergoes property changes due to heating or activation light. Yamasaki does not specifically teach protective layers between each of the layers throughout the thermal-sensitive composition. However, it would have been obvious to have protective layers between the second light to heat converting layer and the thermal-sensitive layer, a protective layer between the first light to heat converting layer and the thermal-sensitive layer and a protective layer between the substrate and the surface substrate layer because Yamasaki teaches undercoat layers, intermediate layers (page 4, [0038]) and thin film layers between the substrate and substrate surface layer which are representative of protective layers.

8. Claims 1, 4-8, 16, 18-19 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamasaki et al., U.S. Patent Publication No. 2003/0143407 A1 in view of Takeda et al., U.S. Patent no. 5,858,604.

Yamasaki teaches a thermal-sensitive composition comprising a support, a surface layer of the substrate (page 18, [0185]), a hydrophilic layer, thin layers formed between the hydrophilic layer and thermal-sensitive layer and between the surface substrate layer and the substrate (page 18, [page 18, [0185]), an underlayer formed just under the thermal-sensitive layer (page 26, [0282]), photo/thermal-sensitive layer (page 13, [0129]) and an overcoat layer comprising light to heat conversion material (page 26, [0282]) as relied upon above. Yamasaki teaches exposing the composition to one wavelength to form a pattern. However, Yamasaki does not teach exposing the composition to a first and second wavelength.

Takeda, in analogous art teaches a photosensitive composition comprising a support, photosensitive layer, a light-shielding layer and a light to heat converting layer. The method of making the composition comprises forming the composition on the substrate, exposing the composition to the first wavelength and then to a second wavelength through removed portions to cause change in solubility of the photosensitive layer in a developer as in claim 16 (col. 4, lines 40-67). Takeda also teaches negative and positive-working compositions (col. 37, line 36). It would have been obvious to one of ordinary skill in the art to modify the method of Yamasaki with a second exposure step as in Takeda to chemically react and cause a change in solubility of the thermal-sensitive layer in a developer solution to remove unexposed portions as taught by Takeda (col. 4, lines 40-67).

9. Claims 16, 17 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamasaki et al., U.S. Patent Publication No. 2003/0143407 A1 in view of in view of Takeda et al., U.S. Patent no. 5,858,604 and further in view of Kouchiyama et al., Storage Technology Laboratories.

Yamasaki teaches a thermal-sensitive composition comprising a support, a surface layer of the substrate (page 18, [0185]), a hydrophilic layer, thin layers formed between the hydrophilic layer and thermal-sensitive layer and between the surface substrate layer and the substrate (page 18, [page 18, [0185]), an underlayer formed just under the thermal-sensitive layer (page 26, [0282]), photo/thermal-sensitive layer (page 13, [0129]) and an overcoat layer comprising light to heat conversion material (page 26, [0282]) as relied upon above. Yamasaki teaches exposing the composition to one wavelength to form a pattern. The thermal-sensitive layer comprises a positive or negative-working composition (page 14, [0142 and 0145]). However, Yamasaki does not teach exposing the composition to blue laser light.

However, Kouchiyama teaches a method comprising exposing a photoresist composition with blue light at wavelengths of 405 to 680nm with numerical apertures of 0.55 to 0.95 (page 769, paragraphs 2-4). Yamasaki in view of Takeda teaches exposing the negative or positive-working composition to actinic radiation at wavelengths of less than 500nm to form patterns, which is representative of the absorption spectra of blue laser light. Therefore, it would have been obvious to one of ordinary skill in the art to use the blue laser of Kouchiyama as the second exposure light in the method of Yamasaki because Kouchiyama teaches multiple exposures of an inorganic thermal layer to laser light in the range of 350 to 650nm which is consistent with blue light, produces



a patterned resist with improved resolution and decreased recording time (page 770, section 2 and page 771, section 4).

### ***Response to Arguments***

10. Applicant's arguments filed 9/23/2008, with respect to the rejection(s) of claim(s) 1-6, 9-13, 20-23 and 26 under 102(e), claims 1, 7, 8, 14-19 and 25 under 103(a) and claims 15 and 24 under 103(a) have been fully considered and are persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, new ground(s) of rejection are made herein.

11. Applicant argues that Kouchiyama does not cure the deficiencies of Moritani and Dentlinger.

Moritani and Dentlinger are withdrawn as prior art. However, Kouchiyama teaches using blue laser light in optical recording medium. The blue laser light increases resolution in the in the photoresist material of the optical recording medium because the wavelength of the blue laser is shorter than the wavelength of conventional lasers used. Kouchiyama also teaches improvements in resolution of the optical recording medium when using a laser of 405nm focused with an NA of 0.95 (page 771, paragraph 4).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CONNIE P. JOHNSON whose telephone number is (571)272-7758. The examiner can normally be reached on 7:30am-4:00pm Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Connie P. Johnson  
Examiner  
Art Unit 1795

/Cynthia H Kelly/

Supervisory Patent Examiner, Art Unit 1795